Calculations
Pharmacology

5 Rights

- Right Patient
- Right Drug
- Right Route
- Right Time
- Right Dose

Weights and Measures

- Metric system
- Apothecary system
- Common Household system

Metric system

- Basic Units
  - Meter (m)
  - Gram (g, Gm)
  - Liter (L, l)

Metric System

- *kilo (k) = 1,000 x more
- hecto = 100 x more
- deca = 10 x more
- 1
- deci = 10 x less
- *centi (c) = 100 x less
- *milli (m) = 1,000 x less
- *micro (mc, μ) = 1,000,000 x less

Apothecary

- Weight
  - 480 grains = 1 oz
  - 12 oz = 1 lb
  - (1.0 grain = 60 mg)
- Volume
- 1 dram = 60 grains (= 4 ml)
- (1 ounce = 30 ml)

Household

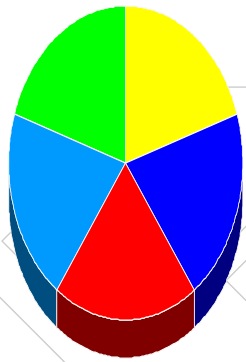
- Tablespoon (T, tbs)
  - 1 T = 15 ml
- Teaspoon (t, tsp)
  - 1 t = 5 ml
- Drop (gtt)
  - 60 gtts = 1 tsp

Additional Measures

- International Units (U)
- Percentage Measures (%)
  - g/100 ml
- Milliequivalent Measures (mEq)
- Ratio Measures (#:###)

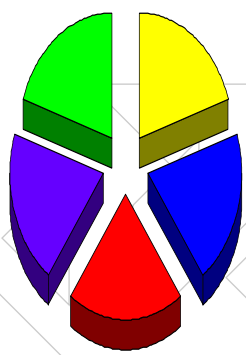
Equivalencies

- 1 pie



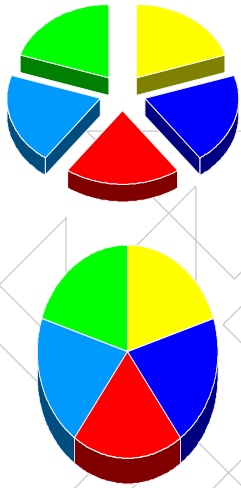
Equivalencies

- 5 slices of pie



Equivalencies

- 5 slices = 1 pie
- 5 slices/pie



Equivalency

- Something divided by itself equals 1
- 1 foot ÷ 12 inches = 1
- 1 six pack ÷ 6 beers = 1
- (1 burger + 1 order of fries + 1 drink) ÷ 1 happy meal = 1

Equivalencies

- 5,280 feet = 1 mile
- 5,280 feet/mile

- 1,000 mg = 1 kg
- 1,000mg/kg

- 60 mg = 1 gr
- 60mg/gr

- 2.2 lb = 1 kg
- 2.2lb/kg

- 1,000 ml = 1 liter
- 1,000ml/l

- 60 drops = 1 ml
- 60 gtts/ml

- 100 mg = 1 ml
- 100 mg/ml

Math Review

- Numerator = top number
- Denominator = bottom number

Conversions

- 1 x 1,000 = 1,000
- 1 x 100 = 100
- 1 x 10 = 10
- 1 x 1 = 1
- 1 / 10 = 0.1
- 1/100 = 0.01
- 1/1,000 = 0.001

- 1 kg = 1,000 g
- 1 mg = 0.001 g
- 1,000 mg = 1 kg
- 0.001 ml = 1 l
- 1 l = 1,000 ml
- 1 kg = 1,000 g
- 1 g = 1,000 mg

Multiplying Fractions

- Multiply the numerators
- Multiply the denominators
- Reduce the product to the lowest common denominator

Dividing Fractions

- Invert the divisor portion of the problem
- Multiply the two numerators
- Multiply the two denominators
- Reduce answer to lowest terms

- $1/2 \div 2/4 = 1/2 \times 4/2 = 1/2 \times 2 = 1$

Dimensional Analysis

- Identify desired units
- Identify relevant givens.
- Identify necessary conversion factors
- Setup problem
- Cancel units
- Reduce fractions
- Solve remaining math

Example #1

- You are ordered to add to a patients IV 50,000 U of Heparin. The available strength is 10,000 U / 1.5 mL. How many mL will need to be added to the IV?

Example #2

- You are ordered to give a patient 130 mg of Lidocaine. The concentration on hand is 100 mg/ 5 mL. How many mL will you give?